ON THE VARIATION OF NOCTURNAL RADIATION DURING STILL, CLEAR NIGHTS.

By A. BOUTARIC.

[Abstracted from *Comptes Rendus*, Paris Acad., Dec. 6, 1920, pp. 1165-1167.]

Contrary to conclusions made by Lo Surdo and Exner, at Naples and on the Sonnblick, respectively, the author found at Montpellier in 1913-14, and more recently at the Pic du Midi, that radiation on still, clear nights reaches a maximum shortly after sunset and then decreases slowly until sunrise. This phenomenon probably is to be attributed to the nocturnal march of temperature and vapor pressure, the first decreasing steadily through the night and thus tending to diminish the radiation, the second also decreasing and consequently tending to increase the radiation. There is another factor, namely, the nocturnal increase of temperature in the air a short distance above the ground, which increases the radiation from the atmosphere and decreases the effective radiation of a body exposed to the free air. The author urges further observations at numerous places in order to acquire more data on this temperature inversion. The formula which the author proposed in an earlier work [1] seems to be sufficiently accurate to render comparable the observations made by himself at Montpellier and the Pic du Midi, by Ångström at Bassour, and by Kimball at Washington. —*C. L. M.*

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APPLICATION OF HEAT RADIATION MEASUREMENTS TO THE PROBLEMS OF THE EVAPORATION FROM LAKES AND THE HEAT CONVECTION AT THEIR SURFACES.

ANDERS ÅNGSTRÖM.

[Abstracted from *Geografiska Annaler* 1920, II. 3.]

After calling attention to the well-known difficulties of measuring evaporation from surfaces or pans, and the further difficulty of determining the actual evaporation from broad lakes or water surfaces, the author points out the possibility of determining the evaporation from natural water surfaces from a heat balance equation, the energy of evaporation being derived from the excess of heat received over heat lost through processes other than evaporation.

A literal equation is formulated, including terms for the various items of heat exchange from water surfaces through radiation, convection, diffusion, and conduction, as well as allowing for gain or loss of heat through storage in the water body in a given time-interval.

Some of the data necessary for determination of the constants in the various terms of this formula are available and are presented in some interesting and valuable tables showing, for example, the relative radiation received for different percentages of cloudiness and the relation of outgoing radiation to temperature and humidity. Using special observations taken for the Swedish Lake Vassijure, the author attempts to calculate the heat balance for specified time-intervals, when there was no gain or loss of heat storage, and the resulting evaporation. The data are meager, but the results are of the right order as compared with measured evaporation from the lake surface for the same interval. Comparison is also made with the evaporation calculated by Stelling's formula. The author concludes that Stelling's formula does not apply to condensation, and that condensation rarely or never occurs on open sea surfaces under natural conditions.

The second portion of the paper is devoted to a study of the possibility of determining convective heat exchange between air and water surfaces. The lines of observation necessary for the solution of this problem are pointed out, but data for numerical calculations are at present unavailable.—*R. E. Horton.*

[1] *Thèse*, Paris, 1918, p. 135. For paper giving in greater detail the formula, see *Comptes Rendus*, May 17, 1920, pp. 1195-1196; or an abstract in *Science Abstracts*, Nov. 1920, § 1375.

TWENTY-FOUR HOUR BAROMETER OSCILLATION IN RELATION TO SURFACE FEATURES.[2]

551.508.4 (048)

By J. VON HANN.

[Reprinted from *Science Abstracts*, December, 1920, §1240.]

Deals with the geographical distribution of the amplitude and phase of the 24-hour barometer oscillation and the effect on it of local conditions. From observations on ships and small ocean islands, the universal 24-hour oscillation is found to be given at the equator by 0.3 sin. $(0° + x)$, the amplitude being in mm., thus having 6 a. m. maximum and a 6 p. m. minimum and differing in phase, as theory demands, by about 180° from the 24-hour temperature wave in the higher layers of the atmosphere. Beyond latitude 40° this universal oscillation becomes inappreciable or masked by that engendered by local surface features and differences of surface heating. This latter is studied by grouping coast and inland stations separately. Latitude is found to exert little influence on the phase, which in nearly all cases gives a night maximum between 6 p. m. and 6 a. m., but the amplitude tends to decrease with increasing latitude, though not regularly. The amplitude is, in general, greater inland than on the coast, the average values being in low latitudes about 0.8 mm. and 0.6 mm., respectively. Stations on mountain slopes and summits are also considered, some of the greatest amplitudes being found here. Finally, some outstanding types of daily-pressure curves are considered and their peculiarities traced to the 24-hour term and explained in the light of the results of the present paper.—*M. A. G.*

THE RELATIONSHIP BETWEEN PRESSURE AND TEMPERATURE AT THE SAME LEVEL IN THE FREE ATMOSPHERE.

By E. H. CHAPMAN.

(Abstracted from *Proceedings, Royal Society of London*, Dec. 3, 1920, 98A : 235-248.)

A correlation coefficient is always lowered in the numerical sense by errors of observation; consequently, after a careful investigation of the probable errors of measurement of temperature and pressure in the upper air, the author has corrected Dines' table of correlation coefficients between pressure and temperature at the same level in the free air [3] and obtains the following table of true correlation coefficients between those quantities:

Height in kilometers.	2	3	4	5	6	7	8	9	10
Jan.-Mar.	0.935	0.885	0.946	0.931	0.916	0.953	1.000	0.903	0.400
Apr.-June	0.559	0.900	1.000	0.992	1.000	0.957	0.841	0.491	0.216
July-Sept.	0.638	0.817	0.848	0.963	0.913	0.957	0.957	0.959	0.464
Oct.-Dec.	0.866	0.862	0.913	0.953	0.935	0.931	0.986	0.870	0.328

The direct proportionality at 8 km. for the first trimester and at 4 and 6 km. for the second trimester is very striking; and it would be profitable to consider what it is that spoils this relation in the other cases.—*E. W. W.*

[2] Akad. Wiss., Vienna, vol. 128, 2a, 1919, pp. 379-506.

[3] W. H. Dines: Characteristics of the Free Atmosphere. *M. O. Geophys.* Mem., No. 13, London, 1919. *Cf.* MONTHLY WEATHER REVIEW, 1919, 47: 644-647, and Computer's Handbook, Sec. V, No. 3, Sec. II, Subsections III-IV.